Legionellosis

(Also known as Legionnaires' Disease and Pontiac Fever)

Section 1:

ABOUT THE DISEASE

A. Etiologic Agent

Legionellosis is an acute bacterial disease caused by *Legionella* species, with *Legionella pneumophila* being the most common. Numerous serogroups are implicated in human disease, although *L. pneumophila* serogroup 1 is most commonly associated with disease in humans.

B. Clinical Description

Legionellosis has two distinct forms: Legionnaires' disease, which is more severe, and Pontiac fever, which is milder. The most common initial symptoms of Legionnaires' disease and Pontiac fever are anorexia, myalgia, malaise, and headache. These symptoms are followed by fever (up to 102–105°F), chills, and a non-productive cough. Other symptoms may include abdominal pain and diarrhea. Legionnaires' disease is primarily associated with pneumonia. The overall case-fatality rate is 5–30%. Pontiac fever is not usually associated with pneumonia or death, and cases usually recover in 2–5 days without treatment. Legionnaires' disease usually cannot be distinguished from other forms of pneumonia and requires specific tests to confirm the diagnosis.

C. Vectors and Reservoirs

Legionella is commonly found in the environment. Organisms have been identified in many different kinds of water and water systems, such as hot and cold tap water, in showers, creeks, ponds, whirlpool spas, cooling towers, and evaporative condensers of large air-conditioning systems. Outbreaks of legionellosis have been linked to these sources, as well as to decorative fountains, humidifiers, respiratory therapy devices and misters (such as those found in the produce section of grocery stores). The bacteria are most likely to reproduce in high numbers in warm, stagnant water. In this environment, they live as intracellular parasites of free-living amoebae.

D. Modes of Transmission

Legionellosis is transmitted via the airborne route when aerosols are inhaled from a water source contaminated with the bacteria, or through aspiration. Legionellosis is not known to be transmitted from person to person. There is no evidence to suggest transmission of *Legionella* from auto air-conditioners or household window air-conditioning units, which do not use water as their coolant.

E. Incubation Period

The incubation period for Legionnaires' disease ranges from 2–10 days, but is most commonly 5–6 days. The incubation period for Pontiac fever ranges from 5–66 hours, but is most commonly 24–48 hours.

F. Period of Communicability or Infectious Period

Legionellosis is not communicable from person to person.

G. Epidemiology

Legionnaires' disease was named after an outbreak that occurred among people attending a convention of the American Legion in Philadelphia in 1976. Legionellosis has a worldwide distribution. An estimated 8,000–18,000 people develop Legionnaires' disease in the U.S. each year. Most of these are single, isolated cases that are not associated with an outbreak. Outbreaks usually occur in the summer and fall, though cases can occur year-round. Serologic surveys have shown a prevalence of antibodies to *L. pneumophila* serogroup 1 at a titer of $\geq$1:128 in 1–20% of the population. Illness most severely affects older persons, especially those who smoke cigarettes or have chronic lung disease. Other risk factors include immunosuppressive therapy and immunosuppressive diseases such as AIDS and diabetes. *Legionella* is estimated to be responsible for 0.5–5% of cases of community-acquired pneumonia.

H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.

Section 2:

REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report the following:

- Isolation of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, blood, or other normally sterile fluid.
- A four-fold or greater rise in antibody titer to specific species or serogroups of *Legionella*, including *L. pneumophila* serogroup 1.
- The detection of *L. pneumophila* serogroup 1 antigens in urine.
- The detection of specific *Legionella* antigen or staining of the organism in respiratory secretions, lung tissue, or pleural fluid by direct fluorescent antibody (DFA) staining, immunohistochemistry (IHC), or other similar method.
- The detection of *Legionella* species by a validated nucleic acid assay.

Note: See Section 3C for information on how to report a case.

B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI), Reference Laboratory will perform cultures for *Legionella* species on clinical specimens other than serum or urine. For more information about *Legionella* cultures, call the SLI Reference Laboratory at (617) 983-6607. In addition, the SLI Viral Serology Laboratory performs an immunofluorescence test on paired sera (two or more mL of sera) to detect immunoglobulin G (IgG) antibodies against *L. pneumophila* serogroup 1. This test is performed for epidemiological purposes.

For more information on testing, call the SLI Viral Serology Laboratory at (617) 983-6396.

Section 3:

REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify sources of exposure (e.g., a contaminated water source), and to stop further transmission from such sources.

B. Laboratory and Health Care Provider Reporting Requirements

Legionellosis is reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of legionellosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *Legionella* infection shall report such evidence of infection directly to the MDPH within 24 hours.

C. Local Board of Health (LBOH) Reporting and Follow-Up Responsibilities

Reporting Requirements

MDPH regulations (*105 CMR 300.000*) stipulate that legionellosis is reportable to the LBOH and that each LBOH must report any case of legionellosis or suspect case of legionellosis, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS) using an official MDPH *Legionellosis Case Report Form* (found at the end of this chapter). Refer to the *Local Board of Health Timeline* at the end of this manual's *Introduction* section for information on prioritization and timeliness requirements of reporting and case investigation.

Case Investigation

1. It is the responsibility of the LBOH to complete a MDPH *Legionellosis Case Report Form* (found at the end of this chapter) by interviewing the case and others who may be able to provide information. Much of the information required on the form can be obtained from the health care provider or from the medical record.
2. Use the following guidelines to assist in completing the case report form:
   a. Accurately record the demographic information and occupation.
   b. Complete the "Clinical Information" section, providing information on diagnosis, date of symptom onset, whether the case was hospitalized, and outcome of disease. One use of this section is to distinguish cases of Legionnaires' disease from Pontiac fever, when possible (e.g., x-ray diagnosed pneumonia indicates Legionnaires' disease).
   c. Collect the information requested in the "Diagnostic Laboratory Test Information" section. This information is important in defining a case. You may ask the health care provider to submit a copy of the medical record or laboratory report(s) to you, or enlist his/her aid in completing these sections of the case report form.
   d. The "Exposure Information" section asks about the case's exposures during the two weeks before onset of illness. Ask questions about travel history, history of dental work, and whether a case visited or worked in a hospital in order to identify where the patient became infected.
   e. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge

information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason(s) why it could not be filled out completely.

3. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked "Confidential") to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
305 South Street, 5th Floor
Jamaica Plain, MA 02130
Fax: (617) 983-6813

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.

Section 4:

CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements *(105 CMR 300.200)*

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Response to a Single Case of Community-Acquired Legionellosis

One case of legionellosis does not require any further investigation, other than completing the MDPH *Legionellosis Case Report Form*. See Section 3C for more information on completing this form. Individuals with sporadic legionellosis typically report that they must have gotten the infection from a particular place, such as a worksite or place of worship or recreation. Since *Legionella* can be found in a wide variety of water sources at low levels, unless another case occurs that also implicates the reported "source," it is difficult to prove if a particular source was the cause of illness. Alleged sources need not be tested or decontaminated based on one community-acquired case.

Response to Nosocomially-Acquired Legionellosis

A laboratory-confirmed case of legionellosis that occurs in a patient who has been hospitalized continuously for $\geq$10 days before the onset of illness is considered a case of nosocomial legionellosis. When a case of nosocomial legionellosis occurs in a hospital or long-term care facility, surveillance efforts for additional cases should be enhanced by the infection control official at the facility. If more cases are identified, measures should be taken to identify the source and to eliminate the contamination. See Section 4D for more information. For detailed recommendations for responding to nosocomial legionellosis, refer to *Guidelines for Preventing Health-Care-Associated Pneumonia, 2003: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee* (see *References* at

the end of this chapter) as well as *Guidelines for Environmental Infection Control in Health-Care Facilities* and *Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC)* on the Centers for Disease Control and Prevention (CDC) website at www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro_guide_03.pdf.

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of reported cases of legionellosis in your city/town is higher than usual or if you suspect an outbreak, investigate clustered cases in an area or institution to determine the source of infection. A source of infection could be a cooling tower, decorative fountain, whirlpool spa, grocery store mister, etc. If evidence indicates a common source, applicable preventive or control measures should be instituted. Testing water sources is a specialized procedure and will require the assistance of environmental professionals. A confirmed source should be cleaned and decontaminated according to established protocols, and a schedule of continued testing must be put in place for a period of time that will be determined on a case-by-case basis. Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization, at (617) 983-6800 or (888) 658-2850, for assistance in investigating, testing, and implementing control measures. The Division can also perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

D. Preventive Measures

To avoid future exposures:

- Cooling towers should be drained when not in use, and they should be mechanically cleaned and maintained according to the manufacturer's recommendations.
- Tap water should not be used in respiratory therapy devices.
- Hotels, cruise ships, and other owners of whirlpool spas and decorative fountains should maintain them according to the manufacturer's recommendations, and they should stay up-to-date on protocols for public health safety.
- After outbreaks, vigilant monitoring of proven sources should be maintained.

A Legionellosis Public Health Fact Sheet is available from the MDPH Division of Epidemiology and Immunization or on the MDPH website at www.mass.gov/dph. Click on the "Publications and Statistics" link, and select the "Public Health Fact Sheets" section under "Communicable Disease Control."

ADDITIONAL INFORMATION

The formal CDC surveillance case definition for legionellosis is the same as the criteria outlined in Section 2A of this chapter. (The CDC and the MDPH use the CDC case definitions to maintain uniform standards for national reporting.) For reporting to the MDPH, always use the criteria outlined in Section 2A.

Note: The most up-to-date CDC case definitions are available on the CDC website at www.cdc.gov/epo/dphsi/casedef/case_definitions.htm.

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FORMS & WORKSHEETS

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Legionellosis

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LBOH Action Steps

This form does not need to be submitted to the MDPH with the case report form. It is for LBOH use and is meant as a quick-reference guide to legionellosis case investigation activities.

LBOH staff should follow these steps when legionellosis is suspected or confirmed in the community. For more detailed information, including disease epidemiology, reporting, case investigation, and follow-up, refer to the preceding chapter.

- ❑ Obtain laboratory confirmation.
- ❑ Fill out the case report form (attach laboratory results).
- ❑ If the patient has been hospitalized continuously for $\geq$10 days before the onset of illness, ensure that surveillance for additional cases is instituted by the infection control official at the facility.
- ❑ Send the completed case report form (with laboratory results) to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS).